THE EXTINCT LAND MAMMALS OF FLORIDA

GEORGE GAYLORD SIMPSON

PREPARED IN COOPERATION BETWEEN THE AMERICAN MUSEUM OF NATURAL HISTORY, NEW YORK, AND THE FLORIDA STATE GEOLOGICAL SURVEY

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THE EXTINCT LAND MAMMALS OF FLORIDA

By George Gaylord Simpson

INTRODUCTION.

Early in 1927 it was agreed between Professor Henry Fairfield Osborn and Mr. Herman Gunter that the American Museum of Natural History should furnish to the Florida State Geological Survey a synopsis of the fossil vertebrate horizons and faunas of Florida. To this end data accumulated for Professor Osborn's forthcoming memoir of the Proboscidea and unpublished notes made by Dr. W. D. Matthew on the occasion of a visit to Florida in 1924 were supplemented by preliminary faunal lists extracted from the literature by Miss Rachel Husband. These data were subsequently placed in my hands for revision and completion, and are in large part incorporated in the present report. In coordination with Mr. Gunter, however, the scope and content of the work have been considerably changed.

Special acknowledgement is due to Professor Osborn, Dr. Matthew, and Miss Husband, who so liberally permitted the use of their unpublished data, to Mr. Walter W. Holmes, whose rich Florida collections, now in the American Museum of Natural History, have been invaluable for comparison and are listed here, and to Mr. J. E. Moore, who has lent much material for identification and has given information regarding his discoveries around Sarasota. Mr. Gunter's constant interest and cooperation have greatly facilitated the progress of the work.

The literature of the fossil vertebrates of Florida is large and it is not proposed to review it here or to attempt a complete bibliography. The Annual Reports of the Florida State Geological Survey contain many important studies, especially by Sellards. The 8th Annual Report, pp. 109-119, contains an annotated bibliography of works on fossil vertebrates to 1916. For the Pliocene and, especially, Pleistocene the comprehensive works of Hay are invaluable and contain many references, especially his "Pleistocene of North America and its vertebrated animals from the states east of the Mississippi River, etc." (Carnegie Inst. Washington, Pub. No. 322, 1923). This work has been used constantly in preparing the present review. A brief supplement to it will be found in Carnegie Mus. Pub. No. 322B, 1927, pp. 273-5. The most recent literature on the Pleistocene may be found by reference to the present writer's study of the Seminole Field (Bull. Amer. Mus. Nat. Hist., LVI, pp. 561-599; 1929) and the papers there cited.

In the following lists some authority is given for the identification of specimens not personally examined. In most cases reference is not to the original descriptions, but to the most recent general reviews, especially those of Sellards and Hay.

The occurrences of vertebrates in Florida are so numerous and scattered that it has never been possible for one worker to study or even to examine all of the known materials. Under these circumstances the published identifications are undoubtedly less comparable than if they were all made by a single student, but they have been accepted (with some changes in nomenclature in the interests of uniformity) except where personal knowledge or unpublished notes have permitted a few corrections. In the lists, when the type specimen came from the locality under consideration it is followed by the word "Type." Authors' names are given in the synopsis.

The great difficulty in the deciphering of these faunas is inherent in the geologic conditions which prevail in Florida and in the history of collecting and research here. None of those splendid sections as seen in the West, where the faunal sequence is frequently so clearly displayed, occur in this subtropical, lowlying region. The fossils have usually been found in mining, dredging, or other operations which disturb the original deposit. Field records, until the last fifteen years or so, were usually quite inexact. To make matters worse, many of the fossils were found in the deposits of streams which had eroded formations of several different ages and mingled their fossil contents in a single bed. This has led to the most divergent opinions—the Alachua Clays, for instance, have been referred to various stages from the Miocene to the Pleistocene, although they contain good guide fossils.

In this state of things, the greatest progress is to be expected from the discovery and acceptance of what may be called test faunas. These may be defined as faunas containing numerous species, occurring under such conditions and collected in such a way as to afford reasonable assurance that they were actually contemporaneous and lived in the same region. Faunas occurring or collected under conditions which could readily give rise to mixture can then be checked by comparison of their species with those of the test faunas. As an example, reported Alachua formation faunas contain *Parahippus, Hipparion,* and *Equus;* but these "faunas" were collected under conditions which make mixture probable and no single test fauna contains more than one of these three genera. Unless very strong contradictory evidence is forthcoming, it is to be assumed that these genera did not occur together in Florida but were originally derived from deposits of three different ages.

The following are the faunas now available which, as recently checked and here listed, may be provisionally advanced as test faunas: for the earliest level, probably of lower Miocene age (Map No. 1), the revised fauna of the Hawthorn formation at Newberry; for the next clearly known horizon, probably of lower Pliocene age (Map No. 2), that of the Bone Valley gravel at Brewster; for the Pleistocene fauna (Map No. 3), of the Melbourne beds, those at Vero, Melbourne, Lecanto, and Seminole. On these rest what is most substantial in our present knowledge of the fossil mammals of Florida. Others will surely be supplied by the present activity of the Survey and other agencies for collecting and research.

New York City,
Aug. 10, 1928.

Extinct giant wolf, *Canis* (*Aenocyon*), from the Pleistocene. Restoration by Charles R. Knight under the direction of Professor H. F. Osborn, reproduced by permission of The American Museum of Natural History.

THE PAST MAMMALIAN LIFE OF FLORIDA.

Among eastern states, Florida has been exceptionally favored in the preservation and discovery of its extinct animals. Fossil remains are widely scattered throughout the state. They have been found in digging wells, in quarries and mines, in dredging operations, in cutting canals, and in other ways. Too often these are discarded or distributed as curios, and it is one of the purposes of this discussion to stimulate interest in these discoveries and to urge that they be brought to scientific attention so that permanent record may be made of these most ancient of historical documents.

None of the rocks of Florida are old enough to contain remains of dinosaurs or other animals that lived before the Tertiary Period, the Age of Mammals, but Tertiary time is well represented among the geological formations of the state. The older rocks of this period, those of the Eocene Epoch (Ocala limestone, etc.), were laid down in the ocean and have as yet furnished no evidence of the land life of this time. The only mammals which they contain are scanty remains of extinct whale-like aquatic forms (*Basilosaurus* or *Zeuglodon*). True whales of various sorts are found in the later marine formations. The extinct land mammals, which alone are here discussed, are known from three epochs: the oldest are from the Miocene, third of the four recognized divisions of the Tertiary; others come from the Pliocene, the last of these divisions; and, finally, the most abundant and widespread of all are the mammals of the Pleistocene, witnesses of the Glacial Period (although not of the glaciers, which even in this cold time stopped far to the north of here).

The oldest land mammals known from Florida, or from anywhere in the eastern part of the United States, have been found in the Hawthorn formation of the Alum Bluff group in Gadsden and Leon Counties, and especially in the vicinity of Newberry in Alachua County. They are not yet very well known—here further discoveries would be especially welcome—but on comparing them with the better known faunas of the West a close agreement is seen which indicates that Florida shared the abundant and to our eyes very bizarre animal life of the time. This same comparison indicates that the occurrences, save for two mentioned below of which our knowledge is very slight, were probably of early Miocene age, apparently relatively soon after the close of the preceding epoch, the Oligocene.

Of the numerous flesh-eating mammals that lived then, only one is yet known from Florida. This is *Mesocyon iamonensis*, an animal related to the recent dogs and wolves and of rather similar appearance.

The hoofed mammals are better known. There was at least one type of rhinoceros (*Caenopus* or *Diceratherium*), smaller than its recent relatives. There was also a small camel (*Oxydactylus*) (Plate No. 36) with a long neck and slender limbs, a tiny deer-like animal (*Leptomeryx*), and a member (*?Entelodon*) of the repulsive group of the "giant pigs"—aberrant animals somewhat resembling wart-hogs, but not ancestral to the true pigs.

Horses are found in most fossil deposits of the age of mammals and their teeth, which are usually abundant and which underwent readily recognizable changes in the course of geologic time, afford a ready means of determining the age of a mammal-bearing deposit. In this lower Miocene fauna the horse most likely to be encountered is *Parahippus*, one of the several types of three-toed ancestral horses. Its teeth may easily be distinguished from those of the later horses found in Florida by the fact that they have rather low crowns, the cusps rising to points, with little cement and open valleys. To anticipate somewhat, the common horse in the Florida lower Pliocene was *Hipparion*, (Plate No. 33) also three-toed, but with high-crowned, prismatic teeth, with much cement. On the inner side of the wearing face of the upper molars appears a ring of enamel which is separate from the rest of the enamel pattern. Finally in the Pleistocene occurs *Equus*, the modern type, with but one toe. Its upper teeth are not wholly unlike those of *Hipparion*, but in Florida (although the rule is not general) are usually larger. They may always be distinguished from that genus, however, by the fact that the inner column of enamel is joined to the rest of the pattern. The figure (Fig. No. 1) here given

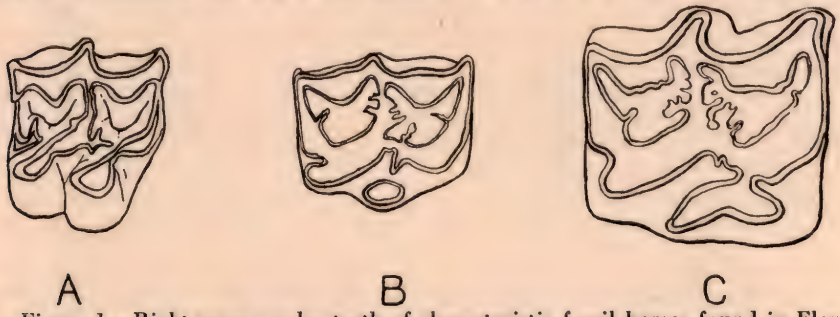


Figure 1.—Right upper molar teeth of characteristic fossil horses found in Florida. A. *Parahippus leonensis*, from the Lower Miocene. B. *Hipparion ingenuum*, from the Lower Pliocene. C. *Equus leidyi*, from the Pleistocene. All 1⅓ times natural size.

will permit anyone to distinguish between these three most common types in Florida and hence, in most cases, to determine the age of a given deposit—but with this caution: horse teeth, being resistant, are often washed out of their original resting places by streams or waves and later included in a deposit of much more recent age. The age of a deposit is that of the *most recent* fossils in it, and if older types occur they will generally be found to have been derived from older beds which have been eroded.

Saber-tooth tiger, *Smilodon*, from the Pleistocene. Restoration by Charles R. Knight under the direction of Professor H. F. Osborn, reproduced by permission of The American Museum of Natural History.

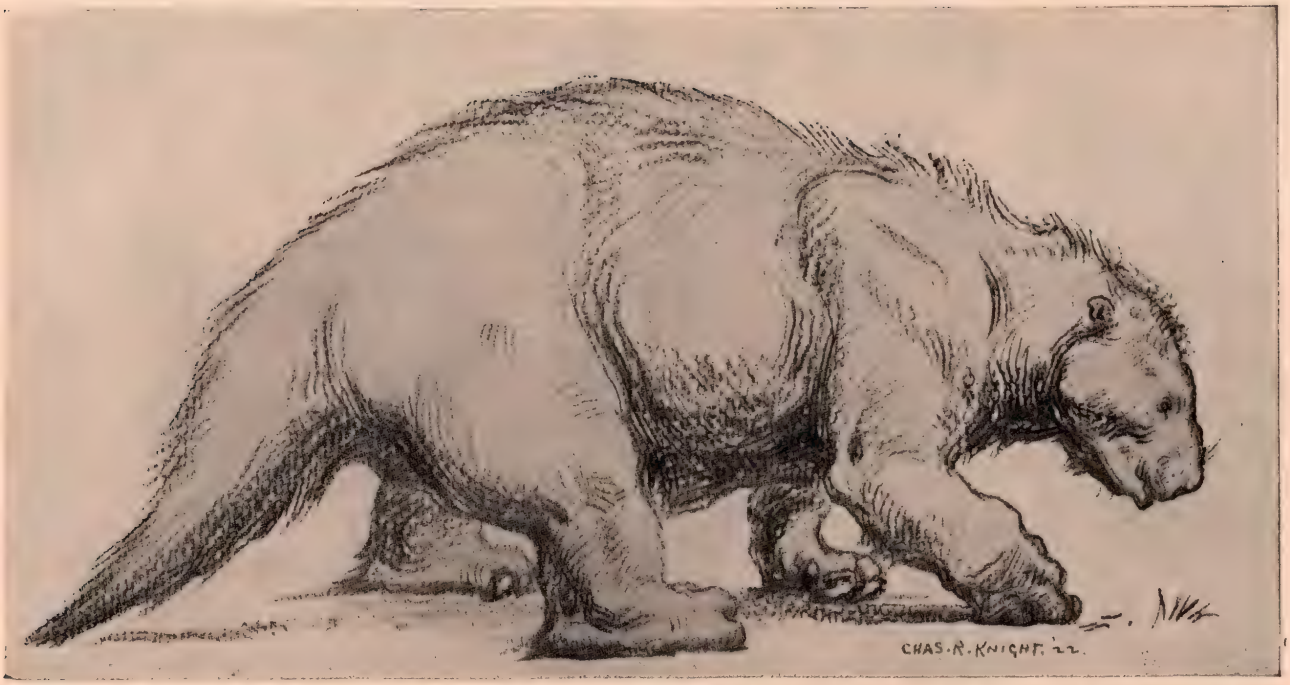
In Gadsden County a few bones and teeth have been found which are also of Miocene age, but which indicate that the stratum in which they occur is probably younger than the fauna which has just been discussed. This seems to be indicated by the presence of a more advanced type of horse, *Merychippus*, in which the molar teeth have somewhat higher crowns than in *Parahippus* and the valleys are completely filled with cement. They probably belong to the middle Miocene, but the other mammals of this age in Florida are still practically unknown. Both *Parahippus* and *Merychippus* were on the direct line of ancestry of the modern horse and the rocks of Florida thus contain interesting chapters of the history of this animal.

Land mammals of a succeeding age, the early Pliocene, are more widespread and somewhat better known. They occur in the Alachua formation and Bone Valley gravel of the phosphate areas, especially in Alachua, Levy, and Polk Counties, and are often encountered in the phosphate mines. None of the animals of the Lower Miocene still survive, although the animals which are present are still very unlike those now living in this region.

The horses are represented by *Hipparion*, (Plate No. 33) which has already been mentioned. The Florida species were among the smallest which have been referred to this genus. *Hipparion* was not in the direct line of ancestry of the living horse, although apparently a descendant of *Merychippus*, and other forms (*Protohippus*, *Pliohippus*) which are known to have lived elsewhere at this time may yet be found in Florida.

Rhinoceroses were still present, probably both of the large, heavy-bodied, short-legged type (*Teleoceras*) (Plate No. 34) and of a type somewhat more like the recent forms, but hornless (*Aphelops*). This was almost their last appearance in the western hemisphere. One of the most important discoveries in Florida was that of *Hyaenarctos schneideri* Sellards, a powerful flesh-eater, with stout teeth and jaws, related both to the bears and to the dogs.

Perhaps the most interesting event which occurred between the time of the earliest Florida land fauna and this one, however, was the arrival in North America of the mastodonts. These, coming from the old world (doubtless from or by way of Asia) reached North America in about middle Miocene times. They quickly spread to Florida and were firmly established there in the Lower Pliocene. First to arrive were the serrate-toothed mastodonts known as *Serridentinus*, (Plate No. 37) which may be traced back to the Siwalik hills of India, Central Mongolia, and even Western Europe. They flourished and attained a large size in the lower Pliocene. Unlike the living elephants, they had tusks in the lower jaws as well as the upper, and various other peculiarities which distinguish them from the other types of mastodonts as well as from the elephants.



Ground-sloth, *Mylodon,* from the Pleistocene. Restoration by Charles R. Knight under the direction of Dr. Chester Stock. Reproduced from "Cenozoic Gravigrade Edentates of Western North America" by Chester Stock, Carnegie Institution of Washington. Pub. No. 331, Plate 45.

It is natural that the most recent fossil mammals, those of the Pleistocene, or Ice Age, should be the most widely distributed in the state and the best known, for the stream and swamp deposits in which their remains are preserved have not yet been so deeply buried as to be inaccessible nor, like most of the older beds, so long attacked by rivers and ocean as to have been largely eroded away and their contents lost or redeposited. Also, at this time the present area of Florida was less extensively covered by the ocean than it had been during most of the Tertiary Period, so that land animals could live, die, and by natural burial be preserved over a larger area than heretofore. Pleistocene mammals have been found, often in great abundance, in all parts of the state. There are few canal spoil banks which do not contain some bones and teeth of animals which lived during the Ice Age.

The richness of the animal life of Florida at this time was extraordinary. It can only be compared with that of the big game region of Africa. Most, perhaps all, of the recent mammals or their immediate ancestors were already present, but there was a host of other and stranger animals besides: lions, saber-tooth tigers (Plate No. 31), camels, horses, mammoths (Plate No. 39), mastodons (Plate No. 38), ground sloths (Plate No. 32), giant armadillos, tapirs, dire wolves, peccaries (Plate No. 35).

Even among the less spectacular animals there were many that no longer inhabit Florida, or that have entirely vanished from the face of the earth. Thus there were at least two species of capybaras, so-called water hogs, relatively large rodents of a group which now lives only in South America; in addition to the recent type of pocket gopher or "salamander" there was another of a type now found only in the western part of the continent; the mouse lemmings, which do not now range so far south, then lived here, and so did the giant beaver, now extinct, beside which the present beaver is a dwarf.

Flesh-eaters were not lacking to prey on this abundant life. In addition to the black bear, there was a short-faced bear (*Arctodus floridanus*) allied to the strange spectacled bear of South America. There was a dire-wolf (*Canis ayersi*) (Plate No. 30), larger than the recent wolf, and a smaller coyote-like dog (*Canis riviveronis*) which is also extinct. Cougars and still larger lion-like cats (*Felis veronis*) were widespread. There was also a saber-tooth tiger (*Smilodon floridanus*) (Plate No. 31), with great stabbing canine teeth.

Ground-sloths, bulky but probably inoffensive relatives of the living South American tree-sloths, were varied, from the gigantic *Megatherium* to the relatively small *Megalonyx*. An armadillo, like that still living in Texas but over twice as large, was also common (*Tatu bellus*), as well as a giant armadillo (*Chlamytherium septentrionale*) with movable bands of bony armor like

Three-toed horse, *Hipparion*, from the Pliocene. Restoration by Charles R. Knight under the direction of Professor H. F. Osborn, reproduced by permission of The American Museum of Natural History.

the living form, and glyptodonts (*Boreostracon floridanus*) (Plate No. 40), which resembled the armadillos and were related to them but were encased in immovable armor like the shell of a turtle, from which their head, legs, and tail emerged.

The horses, of which there were three sorts of somewhat different size, all belonged to the modern one-toed group, *Equus*. There were also several types of tapirs, similar to those still living in South America. Deer were abundant, not only the common white-tail but at least two extinct types of which, unfortunately, little is known. Peccaries, still living in southern North America and in South America, were numerous and varied,—there appear to have been some five or six distinct species. Bisons of a sort no longer living were common, and at least two extinct forms of camels added a strange touch to the landscape.

Finally, mammoths and mastodons were so abundant that their teeth are the most commonly found fossil mammalian remains in the state. The mastodon was the American true mastodon, *Mastodon americanus* (Plate No. 38), more advanced than the earlier Pliocene mastodonts, with tusks in the upper jaw only. The Imperial Mammoth, *Archidiskodon imperator* (Plate No. 39), most common in earlier Pleistocene time, arrived from Northern India, Southwest Europe, and even South Africa. The most abundant elephantine species is the Columbian Mammoth (*Archidiskodon columbi*) which is also abundant in the South Carolina phosphate beds and on the plateaus of Mexico. The true woolly mammoth of the north never reached Florida.

A fact that will already have struck the reader is the resemblance of this fauna to that of South America. Capybaras, short-faced bears, sloths, armadillos, tapirs, camels (llamas, etc.), and peccaries are all animals which we associate with the southern continent at present. This resemblance is due to two causes: some of the animals did come from South America, others originated in the north but survive only in the south. At about the beginning of the Pliocene, South America, which for a very long time had been isolated from all other continents by the oceans, was reunited with North America. Over this new Central American land-bridge came members of groups which had been evolving in isolation in the southern continent: the capybaras, porcupines, ground sloths, armadillos, and glyptodonts. The short-faced bears, tapirs, camels, and peccaries, on the contrary, then entered South America for the first time (along with deer, wolves, horses, mastodons, and other animals) but survived longer in their new home than they did in North America.

Extinct heavy-bodied rhinoceros, *Teleoceras*, from the Pliocene. Restoration by Charles R. Knight under the direction of Professor H. F. Osborn, reproduced by permission of The American Museum of Natural History.

Even this brief review of the ancient life of Florida would be incomplete without some mention of the important role of the state in current investigations regarding the antiquity of man (that is, of the Indians or their predecessors) in North America. Did man enter North America for the first time after the final retreat of the great continental glaciers or was he here before that time? Was man here associated with some of the great extinct animals, as he was in Europe? If so, does this indicate the great antiquity of man in this continent or the recent extinction of these mammals? These are questions which have long been asked and which cannot be finally answered even now. Constantly increasing evidence for the eventual solution of these interesting problems is being accumulated, and some of the most important items of this evidence are being found in Florida. At several places, especially Vero and Melbourne, human bones and the products of human hands have been found in apparent association with the extinct animals described above. If further discoveries confirm these and if they can eventually survive the severe scientific examination and criticism to which they are now properly being subjected, it will appear that man has been in Florida for some tens of thousands of years and that the first arrivals in this region disputed the ground with the mammoths, mastodons, and other great beasts of the glacial epoch.

The final chapter in the history of the animal life of Florida, that of transition from Pleistocene to recent times, is a disastrous one, as it has been almost everywhere. The present fauna of the state is only the poor and colorless remnant of that which it once supported. Half, or perhaps even two-thirds, of the Pleistocene mammals are now extinct and those of their companions which still survive are not only relatively few in numbers but are also generally the smaller and less striking forms. The rabbits, squirrels, rats, mice, some of the carnivores, and one of the deer have survived, but the sloths, armadillos, horses, tapirs, camels, mammoths, mastodons, and many others no longer exist. It is not possible to assign a definite cause to this decimation, but if present conjectures as to the antiquity of man here prove to be correct it will seem quite probable that the destruction of animal life by man, still going on, started with his victory over some of the Pleistocene mammals—a victory for which one must now feel some regret.

Extinct peccary, *Platygonus*, from the Pleistocene. Restoration by Charles R. Knight under the direction of Professor H. F. Osborn, reproduced by permission of The American Museum of Natural History.

CONSPECTUS OF MAMMAL-BEARING DEPOSITS IN FLORIDA.

AGE		TYPICAL FORMATION	WESTERN EQUIVALENT	TYPICAL MAMMALS
?PLEISTOCENE or ?RECENT		"Stratum No. 3" of Vero and its equivalents.	Uncertain	Mainly recent mammals with an uncertain number of extinct forms in common with Stratum No. 2.
PLEISTOCENE		Melbourne beds ("Stratum No. 2" of Vero and its equivalents.)	Uncertain	*Archidiskodon.* *Mastodon.* *Equus, Tapirus.* *Bison, Tanupolama, Mylohyus.* *Felis, Smilodon, Aenocyon.* *Mylodon, Megalonyx, Boreostracon, Tatu.*
PLIOCENE	UPPER	(No land faunas surely referable to these divisions)		
	MIDDLE			
	LOWER	Alachua formation Bone Valley gravel	Probably near the *Hipparion affine* zone, Snake Creek and equivalents.	*Serridentinus* *Hipparion, Teleoceras* *Procamelus* *Hyaenarctos*
MIOCENE	UPPER	(No land fauna surely referable to Upper Miocene)		
	MIDDLE	Hawthorn formation (Zone b)	Lower *Merychippus* zone. Approximately Sheep Creek and equivalents.	*Merychippus.*
	LOWER	Hawthorn formation (Zone a)	Lower *Parahippus* zone. About lower Harison or Rosebud, etc.	*Parahippus, Caenopus* *Entelodon* *Mesocyon*

Extinct camel, *Oxydactylus*, from the Miocene. Restoration by R. Bruce Horsfall under the direction of Professor W. B. Scott. Reproduced from "A History of Land Mammals in the Western Hemisphere" by permission of Professor W. B. Scott and the Macmillan Company.

A four-tusked mastodon, *Serridentinus*, from the Pliocene. Restoration by Charles R. Knight under the direction of Professor H. F. Osborn, reproduced by permission of The American Museum of Natural History.

TABULAR SYNOPSIS OF THE LAND MAMMALS OF FLORIDA.

Scientific Name.	Common Name.	Miocene (Hawthorn Formation)[1]	Pliocene (Alachua Formation) (Bone Valley Gravel)	Pleistocene (Melbourne Beds)	Recent.
MARSUPIALIA					
Didelphis virginiana Kerr.	Opossum	..	..	x	x
INSECTIVORA					
Scalopus aquaticus (Linnaeus)	Little mole	..	..	x	x
Cryptotis floridana (Merriam)	Florida short tailed shrew	..	..	x	x
Blarina brevicauda (Say)	Short tailed shrew	..	..	x	x
RODENTIA					
Sylvilagus floridanus (Allen)	Florida cotton tail	..	..	x	x
Sylvilagus palustris (Miller & Bangs)	Marsh rabbit	..	..	x	x
Sciurus carolinensis Gmelin	Gray squirrel	..	..	x	x
Sciurus niger Linnaeus	Fox squirrel	..	..	..	x
Glaucomys volans (Linnaeus)	Flying squirrel	..	..	..	x
Geomys floridanus (Audubon & Bachman)	Florida pocket gopher (salamander)	..	..	x	x
**Thomomys orientalis* Simpson	Eastern representative of Western pocket gopher	..	..	x	..
Reithrodontomys humilis (Audubon & Bachman)	Harvest mouse	..	..	..	x
Peromyscus polionotus (Wagner)	White footed mice, beach mice	..	..	..	x
Peromyscus gossypinus (Le Conte)	Cotton mice	..	..	..	x
Peromyscus nuttali (Harlan)	Southern Golden mouse	..	..	..	x
Peromyscus floridanus (Chapman)	Florida white footed mouse	..	..	..	x
Oryzomys palustris (Harlan)	Rice rat	..	..	x	x
Sigmodon hispidus Say & Ord	Cotton rat	..	..	x	x
Pitymys parvulus Howell	Florida pine mouse	..	..	..	x
Neofiber alleni True	Round tailed musk-rat	..	..	x	x
**Synaptomys australis* Simpson	Southern lemming mouse	..	..	x	..
**Castoroides ohioensis* Foster	Giant beaver	..	..	x	..
Erethizon cf. *dorsatum* (Linnaeus)	Porcupine	..	..	x	..
**Hydrochoerus holmesi* Simpson	Holmes' Capybara (So-called water hog)	..	..	x	..
**Hydrochoerus* cf. *pinckneyi* (Hay)	Pinckney's giant capybara (So-called water hog)	..	..	x	..

Tabular Synopsis of the Land Mammals of Florida—Continued.

Scientific Name.	Common Name.	Miocene (Hawthorn Formation)[1]	Pliocene (Alachua Formation) (Bone Valley Gravel)	Pleistocene (Melbourne Beds)	Recent.
CARNIVORA					
Euarctos floridanus (Merriam)	Florida black bear	. .	. .	x	x
**Arctodus floridanus* Gidley	Florida short-faced bear	. .	. .	x	. .
Procyon lotor (Linnaeus)	Raccoon	. .	. .	x	x
**Procyon nanus* Simpson	Dwarf raccoon	. .	. .	x	. .
Mustela peninsulae (Rhoads)	Florida Weasel	. .	. .	x	x
Mustela vison Schreber	Florida mink	. .	. .	. .	x
Lutra canadensis (Schreber)	Otter	. .	. .	x	x
Spilogale ambarvalis Bangs	Spotted skunk	. .	. .	x	x
Mephitis elongata (Bangs)	Striped skunk	. .	. .	x	x
**Hyaenarctos schneideri* (Sellards)	Bear-dog	. .	x	. .	. .
**Mesocyon iamonensis* Sellards	An extinct dog	x	. .	. .	. .
Urocyon cinereoargenteus (Schreber)	Gray fox	. .	. .	x	x
**Urocyon seminolensis* Simpson	Seminole gray fox	. .	. .	x	. .
**Vulpes palmaria* Hay	An extinct red fox	. .	. .	x	. .
Canis floridanus Miller	Wolf	. .	. .	. .	x
**Canis ayersi* Sellards	Dire wolf	. .	. .	x	. .
**Canis riviveronis* Hay	Florida extinct coyote	. .	. .	x	. .
Felis coryi Bangs	Florida cougar	. .	. .	. .	x
**Felis* cf. *inexpectata* (Cope)	Extinct cougar	. .	. .	x	. .
**Felis veronis* Hay	Florida lion	. .	. .	x	. .
Lynx rufus (Schreber)	Bobcat	. .	. .	x	x
**Smilodon floridanus* (Leidy)	Florida saber-tooth tiger	. .	. .	x	. .
XENARTHRA (EDENTATA)					
**Megatherium* sp.	Giant ground sloth	. .	. .	x	. .
**Megalonyx ?jeffersonii* (Desmarest)	Jeffersonian ground sloth	. .	. .	x	. .
**Megalonyx* cf. *wheatleyi* Cope	Wheatley's ground sloth	. .	. .	x	. .
**Mylodon ?harlani* Owen	Harlan's ground sloth	. .	. .	x	. .
**Thinobadistes segnis* Hay	Extinct ground sloth (inadequately known)	. .	. .	x	. .
**Tatu bellus* Simpson	Armadillo	. .	. .	x	. .
**Chlamytherium septentrionale* (Leidy)	Northern giant armadillo	. .	. .	x	. .
**Boreostracon floridanus* Simpson	Florida glyptodont or tortoise armadillo	. .	. .	x	. .

Tabular Synopsis of the Land Mammals of Florida—Continued.

Scientific Name.	Common Name.	Miocene (Hawthorn Formation)[1]	Pliocene (Alachua Formation) (Bone Valley Gravel)	Pleistocene (Melbourne Beds)	Recent.
PERISSODACTYLA					
**Parahippus leonensis* Sellards	3-toed horse	x	. .	. .	. .
**Parahippus* sp.	3-toed horse	x	. .	. .	. .
**Merychippus* sp.	3-toed horse	x	. .	. .	. .
*cf. *Miohippus* sp.	3-toed horse	x	. .	. .	. .
**Hipparion minor* Sellards	3-toed horse	. .	x	. .	. .
**Hipparion ingenuum* (Leidy)	3-toed horse	. .	x	. .	. .
**Hipparion plicatile* (Leidy)	3-toed horse	. .	x	. .	. .
**Equus complicatus* Leidy	1-toed horse	. .	. .	x	. .
**Equus leidyi* Hay	1-toed horse	. .	. .	x	. .
**Equus littoralis* Hay	1-toed horse	. .	. .	x	. .
**Tapirus veroensis* Sellards	Florida tapir	. .	. .	x	. .
**Tapirus veroensis sellardsi* Simpson	Sellards's tapir	. .	. .	x	. .
?**Tapirus* cf. *terrestris* (Linnaeus)	American tapir	. .	. .	x	. .
**Caenopus* cf. *platycephalus* (Osborn & Wortman)	Slender-limbed rhinoceros	x	. .	. .	. .
**Teleoceras proterus* (Leidy)	Short-legged rhinoceros	. .	x	. .	. .
**Aphelops longipes* (Leidy)	Long-footed rhinoceros	. .	x	. .	. .
ARTIODACTYLA					
**Leptomeryx* sp.	Tiny, hornless, deer-like animals.	x	. .	. .	. .
*cf. *Blastomeryx* sp.	Small, hornless, deer-like animals	x	. .	. .	. .
Odocoileus osceola (Bangs)	Florida white-tailed deer	. .	. .	x	x
**Odocoileus sellardsiae* Hay	Sellards' deer	. .	. .	x	. .
**?Blastocerus extraneus* Simpson	Florida marsh deer	. .	. .	x	. .
**Entelodon* sp.	Giant pig	x	. .	. .	. .
**Prosthennops* sp.	Extinct peccary	. .	x	. .	. .
**Platygonus* sp.	Extinct peccary	. .	. .	x	. .
**Mylohyus gidleyi* Simpson	Extinct peccary	. .	. .	x	. .
**Mylohyus* cf. *browni* Gidley	Extinct peccary	. .	. .	x	. .
**Mylohyus* cf. *pennsylvanicus* (Leidy)	Extinct peccary	. .	. .	x	. .
**Mylohyus* cf. *lenis* (Leidy)	Extinct peccary	. .	. .	x	. .
**?Tagassu cf. tetragonus* (Cope)	Extinct peccary	. .	. .	x	. .
?*?*Pecari* sp.	Extinct peccary	. .	. .	x	. .
**Oxydactylus* sp.	Giraffe-camel	x	. .	. .	. .

Tabular Synopsis of the Land Mammals of Florida—Continued.

Scientific Name.	Common Name.	Miocene (Hawthorn Formation)[1]	Pliocene (Alachua Formation) (Bone Valley Gravel)	Pleistocene (Melbourne Beds)	Recent.
**Procamelus major* (Leidy)	Extinct camel	. .	x	. .	. .
**Procamelus minor* (Leidy)	Extinct camel	. .	x	. .	. .
**Procamelus minimus* (Leidy)	Extinct camel	. .	x	. .	. .
**Tanupolama mirifica* Simpson	Extinct camel	. .	. .	x	. .
**Tanupolama* cf. *americana* (Wortman)	Extinct camel	. .	. .	x	. .
**Camelops* sp.	Extinct camel	. .	. .	x	. .
**Bison* cf. *latifrons* (Harlan)	Broad-headed bison	. .	. .	x	. .
PROBOSCIDEA					
**Serridentinus floridanus* (Leidy)	Florida serrate-toothed mastodon	. .	x	. .	. .
**Serridentinus brewsterensis* Osborn	Florida serrate-toothed mastodon	. .	x	. .	. .
**Pliomastodon* cf. *matthewi* (Osborn)	Matthew's mastodon	. .	x	. .	. .
**Mastodon americanus* (Kerr)	American mastodon	. .	. .	x	. .
**Archidiskodon imperator* (Leidy)	Imperial mammoth	. .	. .	x	. .
**Archidiskodon columbi* (Falconer)	Columbian mammoth	. .	. .	x	. .
PRIMATES					
Homo sapiens Linnaeus	Man	. .	. .	?x	x

*Extinct. ?*Probably Extinct. ?X Age doubtful.

[1]All lower Miocene, zone a of Hawthorn formation, save Merychippus which is middle Miocene, zone b of Hawthorn formation.

INDIVIDUAL OCCURRENCES.

MIOCENE.

The oldest land mammals known from Florida or, indeed, anywhere in eastern North America apparently belong to the early Miocene or possibly even to the latest Oligocene, transitional to the Miocene. In addition to this there is a very poorly known fauna which comes from the same formation (Hawthorn formation of the Alum Bluff group) but is probably later, belonging somewhere in the middle Miocene, as first recognized by Matthew (ms.).

A. Lower Miocene—Alum Bluff group: zone a of Hawthorn formation.

1. Griscom Plantation, 15 miles north of Tallahassee, Leon County, sec. 32, T. 3 N., R. 1 E. At this point fossils were found in a well about 25 to 50 feet below the surface in "the gray phosphatic sands characteristic of the Alum Bluff Formation" above a hard limestone, probably Tampa. Fla. Geol. Surv. Collection. See Sellards, 8th An. Rept., pp. 82-92.

Parahippus leonensis Type
Mesocyon iamonensis Type
Oxydactylus sp.
Leptomeryx sp.

2. Pit No. 2, Franklin Phosphate Co., Newberry, Alachua County. Fossils found in small fossiliferous pockets in concretionary phosphates above an irregular limestone floor. Fla. Geol. Surv. Collection. Identifications by W. D. Matthew, unpublished manuscript.

Mesocyon iamonensis
Entelodon sp.
Caenopus or *Diceratherium* sp.
Caenopus sp. cf. *platycephalus.*
Ruminant cf. *Blastomeryx*
Camelid cf. *Oxydactylus*
Anchitheriine equid, cf. *Miohippus*

Hay (Carn. Inst. Wash., Pub. No. 322, p. 376) gives a list of fossils said to be from "Hallowell's place of Dall" east of Newberry. The list is a mixture of Miocene, Pliocene, and Pleistocene forms. Of these *Parahippus* sp. is Miocene and may be from the same locality as the above.

Parahippus sp.

B. Middle Miocene—Alum Bluff group: zone b of Hawthorn formation.

3. Fuller's earth mine at Quincy, Gadsden County. Fossils found in "indurated sand above the fuller's earth stratum" near the top of the Alum Bluff Formation. Fla. Geol. Surv. Collection. See Sellards, 8th An. Rept., pp. 82, 87-88.

Merychippus sp.

4. Fuller's earth mine at Midway, Gadsden County. Fla. Geol. Surv. Col. See Sellards, 8th An. Rept., pp. 82-3, 88-90.

cf. *Parahippus* sp.
Merychippus sp.
cf. *Oxydactylus* sp.

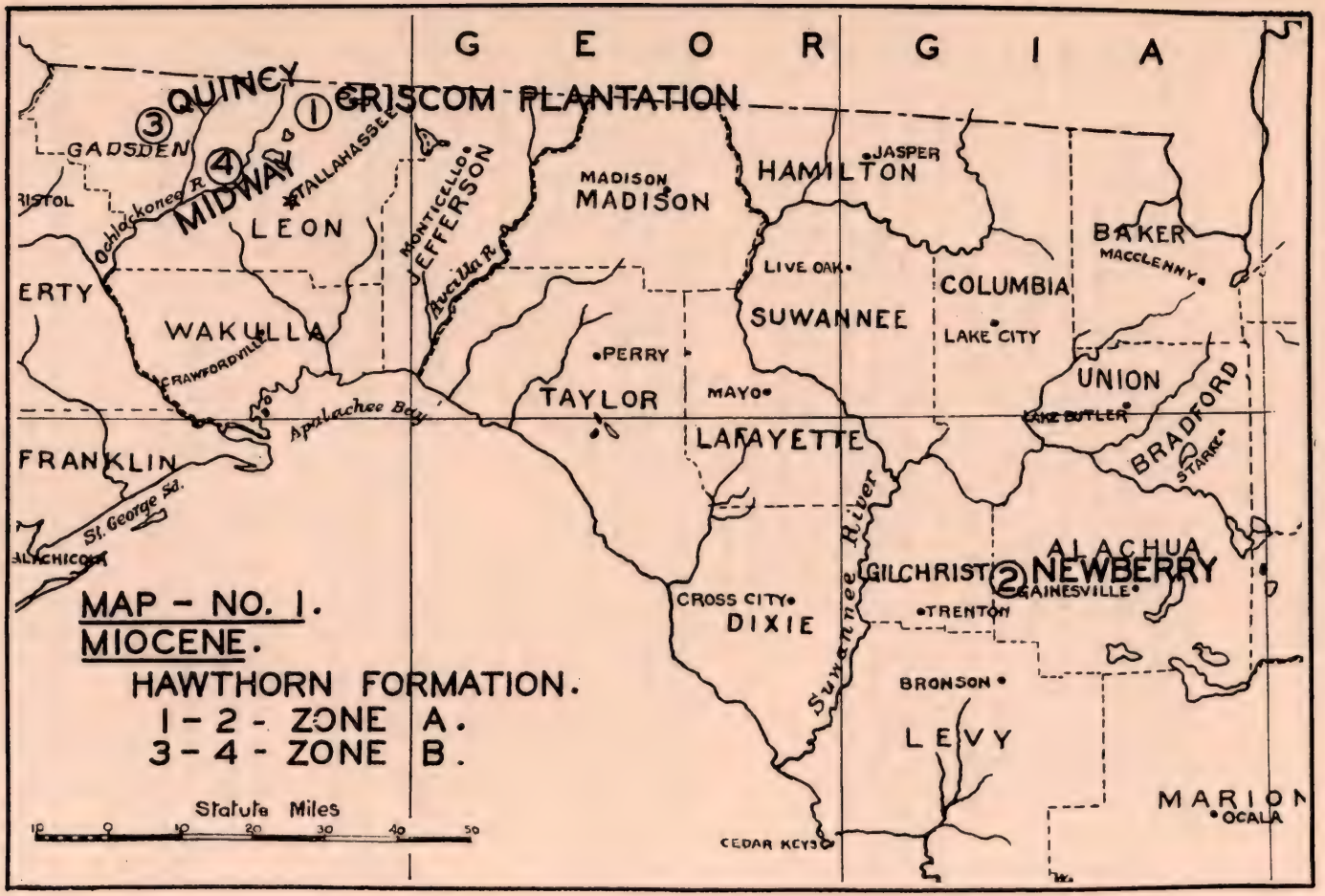


FIGURE 2.—Miocene fossil localities.

PLIOCENE.

The known Pliocene land mammals of Florida appear to represent only a limited part of that epoch—the lower. They are found in three types of deposits: the Alachua formation, (which includes the "Alachua clay" and the equivalent "Dunnellon Formation"), the land pebble phosphates of the Bone Valley gravel, and the river pebble phosphates and other river deposits of Pleistocene and recent age where they are, of course, derived from the older beds.

A. Bone Valley gravel.

This includes the land pebble phosphates, which are marine or estuarine conglomerates, the materials derived for the most part from Miocene or earlier phosphatic beds, reworked and deposited on a very irregular limestone floor. A Pleistocene overburden occurs over most of their area. The possibility of deriviation of fossils from older beds and of accidental mixture with younger fossils in collecting or in the compilation of "faunal lists" based on general localities only is obviously great. In practice, however, the derived fossils are mostly marine and no serious admixture of later forms seems to have occurred. They therefore provide in the fauna at Brewster, below, a pure land mammalian fauna which provides a much needed check for other occurrences in which parts of this fauna have been confused with older and younger mammals.

1. Amalgamated Phosphate Co. (American Cyanamid Co.) pit at Brewster, Polk County. Other pits in the same region, although the exact species are not given, are stated to contain a similar fauna. Collections chiefly of Fla. Geol. Surv. Identifications of Sellards, 7th An. Rept., pp. 95-100, and Osborn, Amer. Mus. Novitates No. 238, pp. 11-12, supplemented and amended by unpublished notes of W. D. Matthew.

Serridentinus floridanus
Serridentinus brewsterensis Type
Pliomastodon cf. *matthewi*[1]
Teleoceras ?proterus
Aphelops ?longipes
Hipparion minor Type
H. *ingenuum*
Procamelus minor
?Prosthennops sp.
Hyaenarctos schneideri Type.

2. Christina, Polk County. See Sellards, 7th An. Rept., p. 106.

Serridentinus sp.

3. Mulberry, Polk County. Prairie Pebble Phosphate Co. See Sellards, 7th An. Rept., pp. 72, 106, 110.

Teleoceras ?proterus
Serridentinus sp.
Hipparion sp.

[1]"Mammut progenium?" of Sellards. The emendation is suggested by Dr. Matthew's notes.

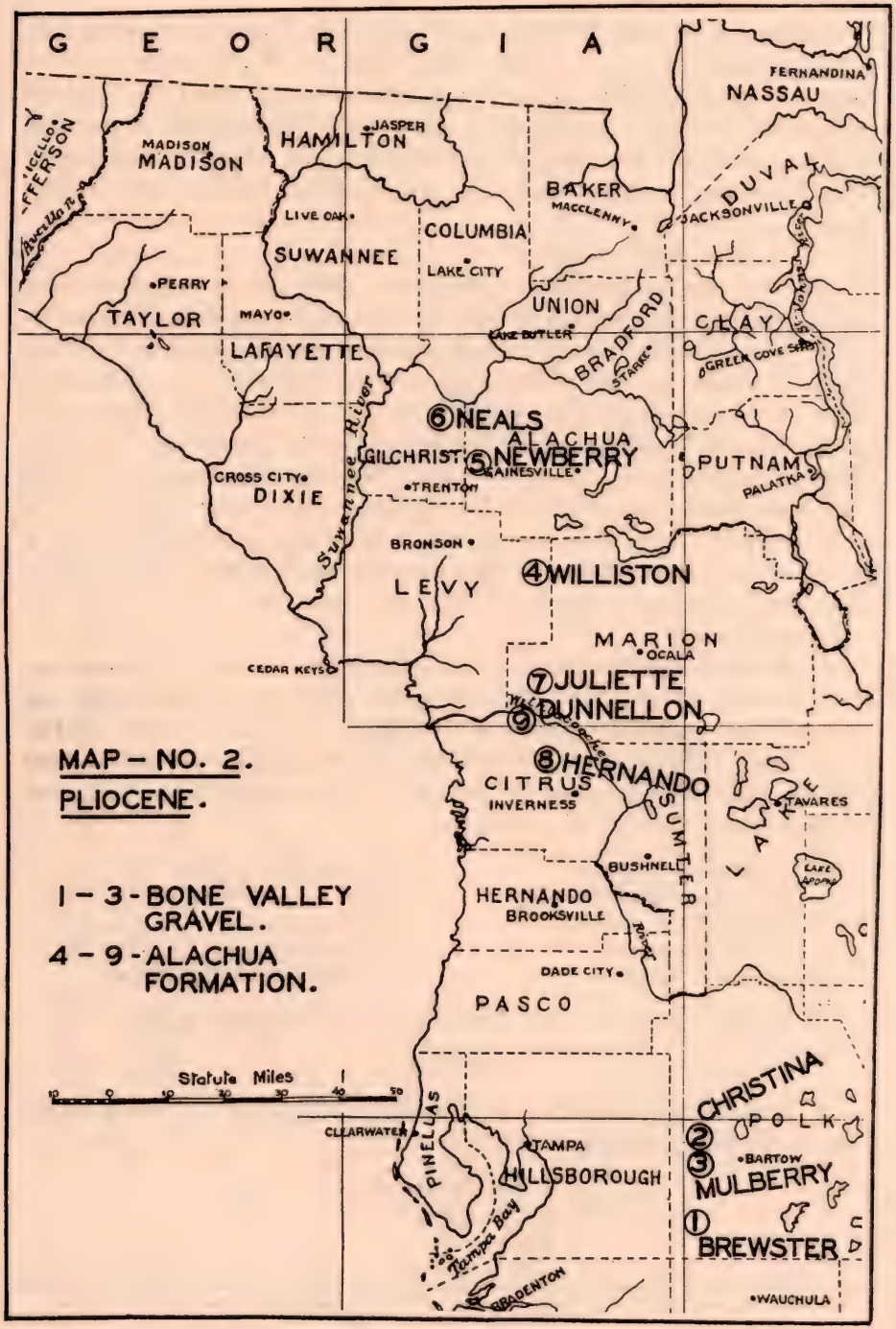


FIGURE 3.—Pliocene fossil localities.

B. Alachua formation.

Various ages, from Miocene to Pleistocene, have been assigned to the mammalian faunas of the Alachua formation. The main reason for this diversity of opinion has been the error and doubt involved in the compilation of faunal lists for this formation. Most of these lists are based on the old material first noticed by Leidy. This was chiefly collected from 1884 to 1890 by J. C. Neal of Archer, W. H. Dall and L. C. Johnson of the United States Geological Survey, and by Professor O. C. Marsh's collector J. B. Hatcher. The final report by Leidy was edited by F. A. Lucas and published after the death of the author (Trans. Wagner Free Inst. Sci., Phila., IV, i-xiv, 15-61).

Archer, Alachua County, is given as the locality for most of the known species and has come to be regarded almost as the type locality for this fauna, but it is really doubtful whether more than a few specimens came from the immediate vicinity of Archer, and these were probably *not* from the Alachua formation. The Leidy-Lucas memoir states that the original collection "had been discovered in . . . [the] vicinity [of Archer] in the adjoining county"—*i. e.*, near Williston in Levy County. Further, "The fossils were obtained from clay beds, mostly on the plantation of J. M. Mixon,[1] in Levy County, ten miles south of Archer [*i. e.*, near Williston]; while others were derived from Hallowell's place, ten miles north of Archer [*i. e.*, near Newberry]." Dall and Leidy have given other localities for "Archer" fossils, presumably included in the current lists: (1) "Pond about a quarter of a mile from the station," (2) "Clay ridge in an old field" about two miles northwest of Mixson's in Levy County, (3) Banks of the Santa Fe River west of Gainesville "where the road crosses the river," (4) along a ditch in soft clay on the Newnansville road, one mile north of Gainesville, (5) near Gainesville along "Owen's ditch," and (6) probably also at Clay Landing on the Suwanee River near Fort Griffin. In all, eight localities were given, without sufficient specification as to the forms from each place, and it is clearly implied that the Leidy-Lucas specimens came mostly or entirely not from Archer, but from Williston and Newberry. Recent inquiry by W. D. Matthew at Archer suggested that only a few Pleistocene fossils were found there.

It is small wonder, then, that Hay's list (Carn. Inst. Pub. No. 322, p. 375) of "such vertebrates as have been found at Archer" includes both Pliocene and Pleistocene fossils, as the specimens on which it was based came from an area some twenty miles across, with fossil bearing formations of at least three different epochs. It is difficult to see how such evidence could be seriously used in attempting to correlate the Alachua formation. It is on this basis and on supporting "evidence" equally fallacious that the fauna has been referred to the Pleistocene. It would be too much to insist that *Hipparion* did not survive into the Pleistocene in Florida, but it may safely be asserted, first, that there is not now any evidence whatever that it did so and, second, that

[1]This name should be Mixson. It has been misspelled in all previous publications.

the fauna of the Alachua formation, when purged of mixture, is probably not later than the close of the lower Pliocene.[1] *Hipparion*, in any event, is a special case and there is no *a priori* reason why it should not have survived here after the close of the Pleistocene, but the same certainly cannot be said of some other members of the fauna, such as *Procamelus*, *Aphelops*, and *Teleoceras*.

4. Mixson's Bone Bed, northeast of Williston, Levy County. The bone bed itself is unquestionably in the Alachua formation and all of the mammals specifically stated to have come from it are of Pliocene aspect, with the possible exception of *Thinobadistes* Hay (?*Mylodon*) which was described long after collection and probably was not actually found in place. The collections are chiefly in the United States National Museum. Besides Leidy and Lucas, see especially Dall, U. S. Geol. Surv., Bull. 84, p. 128; Matson and Clapp, Fla. Geol. Surv., 2nd An. Rept., p. 136; Hay, Carn. Inst. Pub. 322, p. 375. The following are the Pliocene mammals definitely recorded as from this locality:

Serridentinus floridanus	*Procamelus major*
Teleoceras proterus	*P. minor*
Hipparion ingenuum	*P. minimus*
H. plicatile	

Essentially the same list, with the addition of *Aphelops longipes*, and of several Pleistocene mammals, is given as from Archer. *A. longipes* may probably be considered as occurring at Williston also.[2]

5. "Hallowell's Place," near Newberry, Alachua County. It is known that fossiliferous beds of Miocene, Pliocene, and Pleistocene age all occur in the immediate vicinity of Newberry, and mammals of all three epochs have been associated as coming from that place. It is not quite certain how many of the "Archer" species have been found there, the following being the only Pliocene mammal definitely recorded:

Hipparion sp.

Several of the phosphate mines around Newberry have also furnished teeth of *Serridentinus* sp.

6. Neals, Alachua County. A probably Pleistocene tapir recorded in addition to the following. For this and the two following localities see especially Sellards, 5th An. Rept., p. 58.

Serridentinus floridanus
Hipparion sp.

7. Juliette, Marion County.

Serridentinus floridanus

[1]**Serridentinus floridanus** (Leidy) is quite similar to **S. republicanus** Osborn from the Republican River Beds of Western Kansas.

[2]The types of all of these species are in this collection and probably most or all of them came from the Mixson bone bed.

8. Hernando, Citrus County.

Serridentinus floridanus
Hipparion sp.
Procamelus sp.

9. Near Dunnellon, Marion County. This is the type locality of Sellards' "Dunnellon Formation," but Sellards has recognized this as a southern extension of the Alachua formation. As he points out, the fauna recorded is a Pliocene-Pleistocene mixture. The list of Hay (Carn. Inst. Pub. 322, p. 376) is specifically stated to include species dredged from the Withlacoochee River, a circumstance which would make mixture inevitable. The following are the true Alachua species here recorded. See also Sellards, 6th An. Rept., p. 161, and 8th An. Rept., p. 94:

Serridentinus floridanus
Hipparion plicatile
Hipparion sp.
Aphelops longipes
Procamelus minor

Parahippus sp. is also reported, but it was doubtless derived from older beds.

C. River Deposits.

Under this heading may be mentioned the river pebble phosphates and other river deposits in which Pliocene mammals are occasionally found. Sellards (esp. 7th An. Rept., pp. 76-81) has shown that these deposits contain Pliocene fossils *only* where they have been laid down by rivers which have cut through Pliocene beds. In addition to these older mammals and in greater abundance the rivers contain fossils of Pleistocene and even of Recent age. The deposits themselves are of Pleistocene or Recent age, and the older fossils are derived. Unless these derived fossils are recognized and removed from the lists, it is often misleading to speak of these beds (including even the classical Peace Creek) as containing *a* fauna, and still more fallacious to argue from them as to the age of the various deposits in Florida. They can only be interpreted by checking them against the test faunas derived from localities where admixture has not occurred. The common derived fossils are *Hipparion* and, less frequently, the older types of mastodonts. They are likely to turn up in any river deposits near the Alachua and Bone Valley formations.

Among the doubtful or certainly Pliocene fossils which have been associated with Pleistocene faunas, it is necessary to mention *Hipparion princeps* Leidy, the type of which is from Peace Creek. Lucas considered this as an abnormal tooth of *Equus*, and as no other specimen has since been discovered anywhere it is probable that he was correct. True *Hipparion* (*H. ingenuum*) has been found on Peace Creek, however, and two species of this genus, as well as *Serridentinus*, were found in a Pleistocene bed at Sarasota (Hog Creek, infra). But it is not necessary to list all the occurrences of these strays.

PLEISTOCENE.

The difficulties which hinder an attempt to decipher the faunal succession previous to the Pleistocene are here even more pronounced. The occurrences are mostly isolated, mixture with older or with younger faunas has often occurred, the fossils often were not found in place in the original deposit, and the exact locality and horizon is usually not known. If any one of these disabilities applies to a given fauna it cannot be accepted as trustworthy and must be interpreted in the light of the very few faunas which (1) include a considerable number of species (2) which are all contemporaneous beyond reasonable doubt (3) found in place or of surely known derivation, and (4) from a known single locality or limited area. For this reason the Pleistocene faunas are best considered under two headings: (I) the test faunas, which fulfill the conditions just laid down, and (II) the dubious, artificial, or inadequately known faunas which do not. From the standpoint of age, it is probable that a considerable sequence through much or all of the Pleistocene and Recent will eventually be worked out, but at present only two phases can be recognized and the difference even between these is not exactly understood.

The standard section may be considered to be that at Vero. Here there are three distinct horizons, or strata. The lowest, Stratum No. 1 of Sellards and subsequent authors, is the Anastasia formation, a marine deposit probably of early Pleistocene age. Above this is Stratum No. 2, a stream, swamp, and wind deposit clearly of Pleistocene age and containing a large land fauna. Stratum No. 2 and its equivalents have been called the Melbourne beds by Cooke and Mossom.[1] It is probable that all of the Pleistocene faunas listed below are approximately equivalent in age to this stratum, although minor differences in age would be expected were data for their determination forthcoming. The exact age of these deposits is very dubious. Hay considers them as belonging to the Aftonian, or first interglacial stage, except that where, as we believe, mixture with derivatives from the Alachua formation has occurred he would place them in the Nebraskan, or first glacial stage. Certain of these later dubious faunas have sometimes been referred to the upper Pliocene, as the so-called Peace Creek fauna, also on the grounds that indubitable Pliocene mammals here occur. Other authorities, apparently on better evidence, would place Stratum No. 2 and its equivalents in the later Pleistocene. It is impossible to discuss this very complex problem here. Reference may be made to the present author's discussion of the Seminole Field fauna, where the most important literature is cited. (Bull. Am. Mus. Nat. Hist., LVI, pp. 561-599).

Finally, above Stratum No. 2 is a more recent deposit, Stratum No. 3, discussion of which is deferred to the section "?Pleistocene or ?Recent" below.

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[1]Geology of Florida: Florida Geol. Survey 20th Ann. Rept.

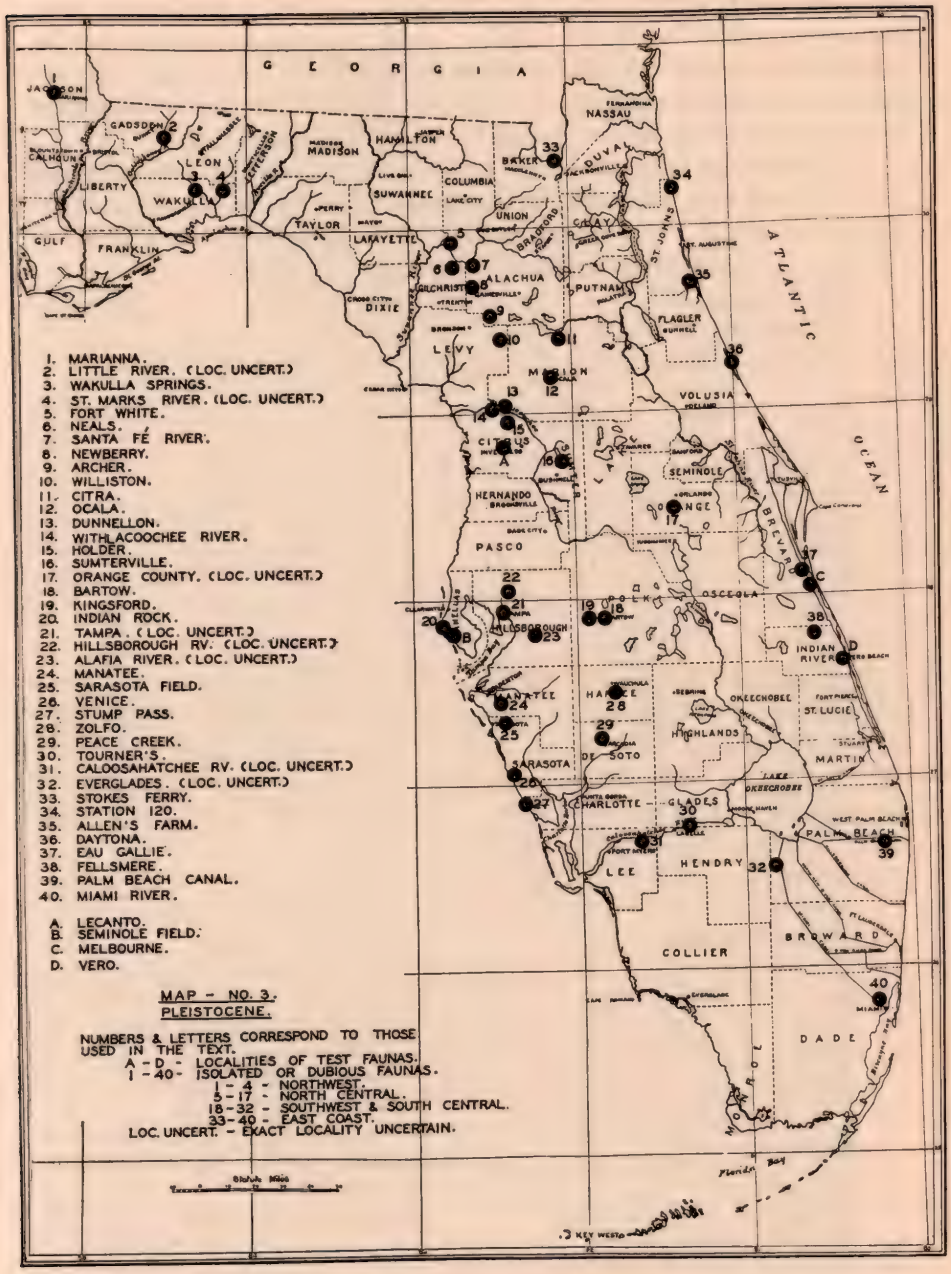

FIGURE 4.—Pleistocene fossil localities.

I. Test Faunas.

Under this heading are included four approximately contemporary Pleistocene mammalian faunas which include many species of quite surely contemporaneous mammals. To differentiate these faunas on the map from the dubious and isolated occurrences, they are marked with letters corresponding to those here used in the text, rather than with numbers.

A. Saber-tooth Cave, Lecanto, Citrus County. Fossils in red cave-earth in a cave one mile northwest of Lecanto on the property of D. J. Allen. Walter W. Holmes Collection in the American Museum of Natural History. See Simpson, Amer. Mus. Novitates, No. 328.

Didelphis virginiana
Cf. *Scalopus* sp.
Sylvilagus floridanus
S. palustris
Geomys floridanus
Thomomys orientalis. Type.
Sigmodon hispidus
Oryzomys palustris
Neofiber alleni
Synaptomys australis. Type
Hydrochoerus holmesi. Type
Canis ayersi
Urocyon sp.
Lynx rufus
Smilodon sp.
Mephitis elongata
Megalonyx cf. *wheatleyi*
Chlamytherium septentrionale
Tatu bellus
Equus cf. *leidyi*
Tapirus cf. *haysii*
Odocoileus osceola
?Blastocerus extraneus. Type.
Camelid indet.
Mylohyus cf. *browni*
Mastodon americanus

B. Seminole Field, Pinellas County. Fossils derived from a single bone bed overlying marine Pleistocene at several localities in the immediate vicinity of the settlement of Seminole, west of St. Petersburg. Walter W. Holmes Collection in the American Museum of Natural History. See Holmes and Simpson (paper on edentates, in course of preparation), and Simpson, Bul. Amer. Mus. Nat. Hist., LVI, pp. 561-599.

Didelphis virginiana
Scalopus sp.
Sylvilagus floridanus
S. palustris
Geomys floridanus
Sigmodon hispidus
Oryzomys palustris
Neofiber alleni
Erethizon cf. *dorsatus*
Sciurus cf. *carolinensis*
Hydrochoerus cf. *pinckneyi*
Synaptomys australis
Canis ayersi
Canis cf. *riviveronis*
Urocyon seminolensis. Type
Mephitis elongata
Spilogale ambarvalis
Mustela peninsulae
Procyon lotor
P. nanus. Type
Lutra canadensis
Arctodus floridanus
Lynx rufus
Felis cf. *veronis*
F. cf. *inexpectata*
Smilodon cf. *floridanus*
Mylodon ?harlani
Megalonyx cf. *wheatleyi*
Chlamytherium septentrionale
Tatu bellus Type
Boreostracon floridanus Type
Equus cf. *complicatus*
E. cf. *leidyi*
Tapirus veroensis sellardsi Type
Platygonus sp.
Mylohyus gidleyi Type
M. cf. *pennsylvanicus*
M. cf. *lenis*
?Tagassu cf. *tetragonus*
Tanupolama mirifica Type
T. cf. *americanus*
Camelops sp.
Bison cf. *latifrons*
Odocoileus osceola
Mastodon americanus
Archidiskodon columbi

The American Pleistocene Mastodon, *Mastodon americanus*. Restoration by Charles R. Knight under the direction of Professor H. F. Osborn, reproduced by permission of The American Museum of Natural History.

The imperial mammoth, *Archidiskodon imperator*, from the Pleistocene. Restoration by Charles R. Knight under the direction of Professor H. F. Osborn, reproduced by permission of The American Museum of Natural History.

Boreostracon, Florida glyptodont or tortoise-armadillo. Probably about seven feet in length. Tentative restoration, based on incomplete remains of shell with the aid of more completely preserved remains of allied genera. Restoration drawn by Mrs. Cornelia Clampitt under the direction of Walter W. Holmes. Presented to the Florida State Geological Survey by Mr. Holmes.

C. Melbourne, Brevard County. Fossils from Stratum No. 2. Joint investigation by Smithsonian Institution and Amherst College. See especially Loomis and Gidley, Amer. Jour. Sci., (5) XII, 254-264. Faunal list by Gidley in Hay, Carneg. Inst. Pub. No. 322B, p. 274, with slight nominal emendations.

Didelphis virginiana
Scalopus aquaticus australis
Sylvilagus cf. *floridanus*
Sylvilagus sp.
Geomys cf. *floridanus*
Neofiber sp.
Neotoma sp.
Hydrochoerus sp.
Euarctos ?floridanus
Arctodus floridanus. Type
Procyon lotor
Canis ?ayersi
Canis riviveronis
Urocyon sp.
Vulpes ?palmaria
Felis veronis
Felis sp.
Lynx rufus floridanus
Lutra canadensis
Megalonyx ?jeffersonii
Mylodon sp.
Chlamytherium septentrionale
Tatu bellus
Boreostracon floridanus
Equus complicatus
E. leidyi
E. littoralis
Tapirus haysii
T. ?veroensis
Bison ?latifrons
Odocoileus osceola
O. sp.
Cervus sp.
Platygonus sp.
Mylohyus sp.
?Tagassu sp.
?Pecari sp.
Tanupolama sp.
Archidiskodon columbi
Archidiskodon imperator

D. Vero, St. Lucie County. Fossils from Stratum No. 2, above Pleistocene shell marl (Anastasia) and below Stratum No. 3 (see below). There is a very extensive literature on this deposit, but especially Sellards, 8th An. Rept., 123-160, and Hay, Carn. Inst. Pub. No. 322, pp. 381-3.

Didelphis virginiana
Cryptotis floridanus
Blarina brevicauda peninsulae
Sylvilagus sp.
Sigmodon sp.
Neofiber alleni
Hydrochoerus ?robustus
Canis ayersi. Type.
Vulpes palmaria
Procyon ?lotor
Lutra canadensis
Smilodon floridanus
Felis veronis. Type
Megalonyx jeffersonii
Mylodon harlani
Chlamytherium septentrionale
Tatu bellus
Equus complicatus
E. leidyi
E. littoralis
Tapirus veroensis. Type.
Odocoileus sp.
Mylohyus sp.
Camelid indet.
Bison sp.
Archidiskodon columbi
Mastodon americanus

II. Doubtful and Isolated Occurrences.

Under this heading are gathered the occurrences for which the field data are inadequate, or which are probably mixed with fossils of different ages, or which consist of only one or a few species. These localities (or, in a few cases, areas) are numbered consecutively to correspond with the numbers on the accompanying map. For convenience they may here be separated into four general groups or regions: northwest Florida, north central Florida, southwest and south central Florida, and the east coast. With few exceptions this is a natural grouping, corresponding roughly both with the geologic conditions and with the faunal divisions in the state today. Of the adequately known faunas, that at Lecanto is near the north central area, that at Seminole near the southwest-south central area, and those at Vero and Melbourne are in the east coast area. It seems quite possible that these occurrences are not all of the same age, but there is no internal evidence of age difference as yet and the better known of them appear to be approximately equivalent to the Stratum No. 2 and Seminole faunas.

a. Northwest Florida.

There are only a few unimportant records from this part of the state.

1. Marianna, Jackson County. No exact data. See Hay, Carn. Pub. 322, p. 121.

Mastodon americanus

2. Little River, Gadsden County. No exact data. See Sellards, 8th An. Rept., p. 104.

Mastodon americanus

3. Wakulla Spring. One or probably two skeletons said to come from spring. See Sellards, 8th An. Rept., p. 103, and Hay, Carn. Mus. Pub. 322, p. 179-80.

Archidiskodon sp.
Proboscidean indet.

4. St. Mark's River, Wakulla County. No exact data. See Hay, Carn. Inst. Pub. 322, p. 157.

Archidiskodon columbi

b. North Central Florida.

Under this heading is included a rather compact series of fossil localities, extending from southern Columbia County to Sumter County. This region is underlain by limestones of lower Tertiary age, and is, broadly, the region in which the Pliocene Alachua formation occurs in scattered areas. Several of the localities are supposed to have yielded both Pliocene and Pleistocene fossils and have been discussed above in connection with the Pliocene. For them see especially Sellards, Fla. State Geol. Surv. 8th An. Rept., and Hay, Carnegie Inst. Pub. 322, as cited above. The mammals listed below are those which are believed to belong properly with the Pleistocene fauna.

5. Three miles northwest of Fort White, Columbia County. No exact data as to horizon. See Hay, Carn. Pub. No. 322, p. 121.

Mastodon americanus

After this paper was in proof, information was received regarding an important Pleistocene locality about a mile below the springs at the head of the Itchtucknee River in Columbia County. The locality is northwest of Fort White, yielded several mastodon skeletons many years ago, and is probably the one recorded by Hay. A collection was recently made by J. Clarence Simpson, of High Springs, from the bed of the river and generously presented by him to the State Geological Survey. L. G. Getzen and J. D. Lowe also presented specimens. More detailed study of this fauna is planned, but for immediate record the following field identifications are given:

Didelphis virginiana
Neofiber cf. *alleni*
Castor sp.
Hydrochoerus cf. *holmesi*
Procyon ?lotor
Lutra ?canadensis
?Arctodus sp.
Mylodon sp.
Equus cf. *complicatus*
Tapirus sp.
Mylohyus sp.
Odocoileus osceola
Mastodon americanus
Archidiskodon colombi

6. Neals, Gilchrist County. Pliocene fossils also recorded.

Tapirus ?terrestris

7. Buttgenbach Mines, Santa Fe River, 6 miles north of Wade, Alachua County. Apparently dredged. No Pliocene fossils reported. See Hay, Carn. Pub. No. 322, p. 376.

Equus cf. *leidyi*
Bison sp.

8. "Hallowell's Place," east of Newberry, Alachua County. Pliocene fossils also reported.

Equus littoralis
Odocoileus ?osceola

9. Archer, Alachua County. As stated above, a number of Pliocene and Pleistocene fossils have been recorded as from this place, but the majority of them actually came from Newberry, Williston, or other localities. Some Pleistocene fossils have been found here, although it is not certain which ones. The following Pleistocene species are credited to this locality by Hay:

Megatherium mirabile
Tapirus ?haysii
Odocoileus ?osceola

10. Near Williston, Levy County. Dr. Matthew (unpublished notes) reports a pocket of Pleistocene fossils, including *Megatherium*, about one mile west of the Mixson bone-bed. Hay states that *Thinobadistes* is from this bone bed, but as it was described long after collection, as at least one Pleistocene pocket occurs in the immediate vicinity, and as it is of Pleistocene aspect

whereas all the other Mixson bone-bed fossils are of Pliocene aspect, it seems highly probable that it was not actually found in this bed.

Megatherium sp.
Thinobadistes segnis

A tooth of *Bison* sp. was found on the surface above the Mixson bone-bed by Mrs. Eliza Mixson.

In 1928 C. L. Moody made a small collection of isolated bones and a few teeth in the pit of the Florida Shell Rock Company, two miles north of Williston. These were presented to the Florida State Geological Survey and submitted to the present writer for identification. The mammals are of Pleistocene age, but a few marine fossils (shark, ray, crab, bryozoa), derived from older beds, were found with them. The following are generically identifiable:

Didelphis ?virginiana
Sylvilagus sp.
Felis cf. *veronis*
Tatu bellus
Equus sp.

11. Citra, Marion County. No exact data. See Hay, Carn. Pub. No. 322, pp. 121, 158.

Mastodon americanus
Archidiskodon columbi

12. Ocala, Marion County. Fossils found in one or more solution channels in the Eocene limestone, filled with a sandy clay matrix in which the bones occur. With one possible exception the fauna seems to be a unit of Pleistocene age. See especially Sellards, 8th An. Rept., pp. 102-3, and Hay, Carn. Inst. Pub. No. 322, p. 378.

Sylvilagus sp.
Smilodon floridanus
Tatu bellus
Equus leidyi
Tapirus sp.
Odocoileus sp.
Camelid indet[1]
Bison sp.

13. Near Dunnellon, Marion County. Both Pliocene and Pleistocene fossils are recorded from the vicinity of Dunnellon. The following are the

[1]Leidy (Trans. Wagner Free Inst. Sci. Phila., II, 13-17) referred a single M_3 to **"Auchenia minima"**—an Alachua species. Since this species was later placed in the genus **Procamelus** it has been assumed that the same is true of the Ocala specimen, and **Procamelus** appears in the Ocala lists, although it was questioned by Sellards. Inasmuch as the dentition of **P. minimus** is quite unknown, aside from this tooth, and the specimen itself reveals nothing diagnostic of **Procamelus** as against a Pleistocene genus (to judge from Leidy's figure and description), the inclusion of **Procamelus** in this fauna seems unjustified. If it is present, it was probably derived from beds older than the actual fissure filling.

isolated occurrences of Pleistocene fossils, aside from those definitely assigned to the Withlacoochee River.

a. Given as from Dunnellon, not specifically stated to be dredged:

Felis sp.
Megalonyx sp.
Odocoileus osceola

b. 6 miles east of Dunnellon

Mastodon americanus

c. Camp Phosphate Company's Blue Run Mine

Equus leidyi
Cervid indet.

d. Dunnellon Phosphate Co.

Megalonyx sp.

14. Withlacoochee River. The following Pleistocene species are said to be from this river. Except for *Odocoileus*, which was found in Cullen's River Mine near Dunnellon, no exact data are given, but they were probably all dredged in the vicinity of Dunnellon. See Sellards, 8th An. Rept., p. 104, and Hay, 8th An. Rept., p. 43.

Euarctos sp.
Chlamytherium septentrionale
Equus leidyi
Tapirus ?haysii
Odocoileus osceola
Bison sp.
Mastodon americanus
Archidiskodon columbi

15. Withlacoochee River near Holder, Citrus County.[1] Dredged. See Hay, Carn. Pub. No. 322, pp. 158, 196.

Equus sp.
Archidiskodon columbi

16. Sumterville, Sumter County. Said to be from "three miles east of Holder," but this must be a *lapsus calami*, as the specified point would not be near Sumterville. No other data. See Hay, Carn. Inst. Pub. No. 322, p. 158.

Archidiskodon columbi

17. Orange County. No data. Hay, Carn. Inst. Pub. No. 322, p. 196.

Equus sp.

c. Southwest and South Central Florida.

Under this heading is included, broadly, the area between the Hillsborough and Caloosahatchee Rivers. Pleistocene deposits rich in mammals apparently occur throughout this area and it offers exceptional opportunities for future work. Collecting must be done in the most careful way, however, and the interpretation of the results must be cautious, for mammal-bearing Pliocene beds (Bone Valley gravel) occur at numerous places and most of the larger Pleistocene and Recent streams have cut through them.

18. Bartow, Polk County. No exact data, see Hay, Carn. Inst., Pub. No. 322, p. 180.

Proboscidean indet.

[1]Locality given by Hay as sec. 29, T. 17 S., R. 19 E., but this section is not on the river.

19. Kingsford, Polk County. Collected in the phosphate mines around Kingsford by J. C. Edmondoz. The *Archidiskodon* is said to have been buried under nineteen feet of phosphate rock and sand. See Hay, Carn. Inst. Pub. No. 322, pp. 379-380.

Equus leidyi
Equus littoralis
Archidiskodon sp.

20. Indian Rock, near St. Petersburg, Pinellas County. No data. Specimen had been in sea water. See Hay, Carn. Inst. Pub. No. 322, p. 159.

Archidiskodon columbi

21. Around Tampa, Hillsborough County. *Archidiskodon columbi* is recorded as from Tampa. The same species and three others are recorded as from Tampa Bay, without indication of any precise origin. They were probably dredged. See Hay, Carn. Inst. Pub. 322, p. 379, 159.

Archidiskodon columbi
Mastodon americanus
Tapirus sp.
Bison sp.

22. Hillsborough River, Hillsborough County. No exact data. See Sellards, Amer. Jour. Sci., (5) XL, 139.

Chlamytherium septentrionale

23. Alafia River, Hillsborough County. From phosphate dredgings. See Hay, Carn. Inst. Pub. No. 322, p. 379.

Equus complicatus
Equus leidyi
Tapirus sp.
Bison sp.
Mastodon americanus

24. Manatee Field, Manatee County. This name is used to designate an area in western Manatee County, including the town of Manatee, in which scattered occurrences are clustered. None of them have clear and useful records. See Hay, Carn. Inst. Pub. No. 322, p. 379.

a. Palma Sola. Fossils found by C. T. Earle as drift on the beach.

Equus complicatus
Equus leidyi
Equus littoralis
Odocoileus sp.
Mylohyus ?lenis
Bison ?latifrons
Archidiskodon columbi

b. Palmetto.

Odocoileus sp.
Bison sp.
Archidiskodon imperator

c. Manatee.

Equus leidyi
Equus littoralis

d. Bradenton. See Hay, Carn. Inst. Pub. No. 322B, p. 275.

Equus leidyi
Archidiskodon columbi

e. Tallevast. See Hay, Carn. Inst. Pub. No. 322B, p. 275.

Equus leidyi

25. Sarasota Field. This name is used to include a similar cluster of localities in the northwestern part of Sarasota County. In addition to the records of Sellards and Hay, I have had the privilege of examining the rich and important collections of J. E. Moore, of Sarasota. This is one of the most promising areas for Pleistocene exploration in the entire state, and detailed field work is planned for the immediate future.

a. Sarasota Bay. No exact data. Collected by J. Willcox. See Sellards, 8th An. Rept., p. 103.

Chlamytherium septentrionale
Equus sp.
Archidiskodon columbi

b. White Beach, Sarasota Bay. See Hay, Carn. Inst. Pub. No. 322, p. 379.

Chlamytherium septentrionale
Equus complicatus
Equus leidyi

c. Eight miles southeast of Sarasota. Collected by Barnum Brown in 1911. See Hay, Carn. Inst. Pub. No. 322, p. 379.

Chlamytherium septentrionale
Equus leidyi
Archidiskodon columbi

d. Mouth of Hog Creek at Sarasota, Sarasota County. Found in a stratum of blue clay "on top of a solid limestone formation at about 11 or 12 feet from the surface. The clay was from 8 to 14 inches in depth and was overlain by a gray clay containing phosphate pebbles", (Moore). Collection of J. E. Moore, who kindly submitted them for identification and inclusion here. The deposit is of Pleistocene age but its phosphate content and some of its fossils were derived from the Pliocene land phosphates to the eastward. It contains a few much rolled teeth of *Hipparion* (probably *H. ingenuum* and *plicatile*) and fragments of *Serridentinus* molars. There are also numerous lower vertebrates, reptiles and fishes, also in part derived from older beds. The following are the Pleistocene mammals:

Didelphis virginiana
Sylvilagus sp.
Geomys ?floridanus
Neofiber alleni
Urocyon sp.
Procyon lotor
Lynx sp.
Felis cf. *inexpectata*
Smilodon floridanus
Megalonyx cf. *wheatleyi*
Mylodon ?harlani
Tatu bellus
Chlamytherium septentrionale
Boreostracon floridanus
Equus leidyi
Tapirus ?veroensis
Platygonus sp.
Mylohyus sp.
Odocoileus sp.
Bison sp.
Camelid indet.
Archidiskodon columbi
Mastodon americanus

e. Phillippi Creek and Fruitville Ditch. The fossils were found along the creek and on the ditch which "is a lateral of Phillipi Creek. About ¾

mile distant from the creek is a cross ditch and where they cross I have found a great many fossils." (Moore). The canal is about seven miles east of Sarasota. The fauna is the same at these two closely approximated localities and is equivalent to that of the Melbourne beds. Material in the collection of J. E. Moore, lent for study. Mastodon and mammoth also identified by Hay, see Carn. Inst. Pub. No. 322B, p. 275.

Didelphis virginiana
Castoroides ?ohioensis
Canis cf. *riviveronis*
Canis ayersi
Procyon lotor
Felis cf. *veronis*
Gravigrade, indet.
Chlamytherium septentrionale
Equus leidyi
Odocoileus sp.
Tanupolama mirifica
Bison sp.
Mastodon americanus
Archidiskodon columbi

26. Venice, Sarasota County. A considerable fauna has been discovered here, chiefly by J. W. Gidley, but he has not yet made the results available. The following, collected by J. E. Moore, is the only specimen of which the writer has personal knowledge:

Tapirus veroensis

27. Stump Pass, Sarasota County. See Sellards, 8th An. Rept., p. 103.

Bison sp.

28. Zolfo, Hardee County. Found by Barnum Brown, 1911, in place "six feet above white sand" on Peace Creek, one mile south of Zolfo. Amer. Mus. No. 15546.

Archidiskodon columbi

29. Peace Creek (or River), De Soto County. This is the classic locality for the Pleistocene of Florida and the name "Peace Creek fauna" is often extended to all of the faunas similar to that of the Melbourne beds. Peace Creek flows through both Miocene and Piocene beds, however, and the reported fauna includes some Pliocene species of mammals. The specimens have various origins and the collecting here has not been rigidly controlled. Most of the material has been derived from sand bars or from dredging operations. The literature is fairly extensive, but reference should be made especially to Leidy, Trans. Wagner Free Inst. Sci., Phila., II, 19-31; Sellards, 8th An. Rept., 101-2; and Hay, Carn. Inst. Pub. No. 322, 380-1.

a. At Calvenia, mouth of Charlie Apopka Creek (Hay)

Equus leidyi

b. At and near Arcadia

Megalonyx ?jeffersonii
Boreostracon floridanus
Chlamytherium septentrionale. Type.
Equus leidyi. Type.
Equus littoralis. Type.
Tapirus haysii
Odocoileus sp.
Bison sp.
Mastodon americanus
Archidiskodon columbi
Archidiskodon imperator

Archidiskodon sp.

30. Tourner's, or Turner's, Caloosahatchee River, Glades County. Hay, Carn. Inst. Pub. No. 322, p. 160, and Pub. No. 322B, p. 275.

Archidiskodon columbi

31. Caloosahatchee River above Ft. Myers and around La Belle, Lee and Hendry Counties. Some specimens dredged, others in sand and muck above shell marl. See Sellards, 8th An. Rept. p. 102; Hay, Carn. Inst. Pub. No. 322, p. 384.

Mylodon harlani
Equus leidyi
Equus sp.
Bison cf. *latifrons*
Archidiskodon columbi

32. "Everglades"—possibly in Palm Beach or Hendry County. No data. See Hay, Carn. Pub. No. 322, p. 163.

Archidiskodon sp.

d. East Coast.

The Pleistocene and Recent rivers of the east coast have the peculiar advantage that they apparently have not cut any formations containing pre-Pleistocene land mammals. Some confusion of different Pleistocene horizons and of Pleistocene and Recent mammals there undoubtedly has been, but none of the known mammals suggests the Pliocene. Both at Melbourne and Vero large faunas are known (above) and others will certainly be found with continued work. Any one of the following isolated occurrences may indicate a locality where intensive collecting will have large results.

33. Stokes Ferry, Nassau County. Said to be either Charlton or Satilla Formation. See Hay, Carn. Pub. No. 322, p. 374.

Equus sp.
Archidiskodon ?columbi

34. Station 120, Inland Waterway Canal, 20 miles north of St. Augustine, Duval County. (Near Pablo Beach). In sand and muck above Pleistocene shell marl. See Sellards, 8th An. Rept., p. 106.

Odocoileus sp.
Bison sp.
Mastodon americanus
Archidiskodon columbi

35. Inland Waterway Canal, Allen's Farm, 20 miles south of St. Augustine (near Matanzas?), St. Johns County. F. R. Allen, collector. Thrown out by dredge; from sand and muck above Pleistocene shell marl. See Sellards, 8th An. Rept., p. 106.

Mylodon cf. *harlani*
Equus sp.
Bison sp.
Mastodon americanus
Archidiskodon columbi

36. Daytona, Volusia County. Fossils from shell marl pits. Mastodon from oyster bed within city limits, five feet below surface (Hay). See Sellards, 8th An. Rept., p. 105, and Hay, Carn. Inst. Pub. No. 322, p. 122.

Mastodon americanus
Archidiskodon columbi

37. Eau Gallie, Brevard County. From Hopkins Drainage Canal. Sellards, 8th An. Rept., p. 105.

Equus complicatus

38. Fellsmere, Indian River County. "Either in or upon Pleistocene shell marl." Sellards, 8th An. Rept., p. 105.

Mastodon americanus
Archidiskodon columbi

39. Palm Beach Canal, Palm Beach County. Fossils found in digging the canal. From sand and muck above shell marl. The mastodon was found about eight miles west of the crossing of the Florida East Coast Railway. Sellards, 8th An. Rept., pp. 105-6.

Equus complicatus
Bison sp.
Mastodon americanus
Archidiskodon columbi

40. Miami River, Dade County. No exact data. This is the most southern point in the United States for any known fossil mammal. Sellards, 8th An. Rept., p. 106.

Proboscidean indet.

It may be added that Dr. Gidley has discovered an important fauna at New Smyrna, but he has not made the results available as yet.

PLEISTOCENE OR RECENT.

Under this heading are to be considered Stratum No. 3 of Vero and its equivalents. This stratum probably occurs at most places along the east coast but it has been carefully studied only at Vero and Melbourne, and only the Vero results are yet available. It is probable that an equivalent deposit is also present at some places on the west coast. Its essential characters are that it is a fresh-water and aeolian deposit overlying Stratum No. 2, and cut by the present drainage system. Its contact with Stratum No. 2 is said to be unconformable—the deposition of the older stratum was followed by a period of erosion before this deposit was laid down. Its age is, therefore, somewhere between that of the Pleistocene Stratum No. 2 and that of the recent stream deposits. Cooke and Mossom regard it as recent. The conditions of its for-

mation make it very difficult to be sure that a given species was not derived from the older bed and the very uneven lower contact plane makes it difficult even to be sure that a specimen found near this plane (as most of them apparently were) was actually in Stratum No. 3 and not No. 2. Furthermore, it is apparently difficult always to distinguish between this stratum and the recent deposits, the latter containing many derived Pleistocene fossils. For these reasons, although it is certain that a distinctive fauna does occur in Stratum No. 3, it is highly probable that the fauna attributed to it at present is partly based on older and younger specimens. Further careful work is needed to clear up this important problem, but unless the stratum can be found in some area where Stratum No. 2 does not occur it will always be extremely difficult to exclude mixture of the faunas. On the geology, see especially Sellards, 8th An. Rept., p. 123-160, and Cooke, Am. Journ. Sci., (5) XII, p. 441-452. The following mammals are attributed to this bed at Vero by Hay (Carn. Inst. Pub. No. 322, p. 382) but, as noted above, it almost surely includes fossils of somewhat different ages:

Didelphis virginiana
Scalopus aquaticus australis
Sylvilagus palustris
Neofiber alleni
Neotoma floridana
Sigmodon hispidus
Oryzomys palustris
Lynx rufus floridanus
Canis riviveronis. Type.
Canis sp.
Vulpes palmaria. Type.
Lutra canadensis
Euarctos floridanus
Procyon lotor
Tatu bellus
Chlamytherium septentrionale
Equus ?littoralis
Equus ?leidyi
Tapirus ?haysii
Odocoileus sellardsiae. Type.
?Mylohyus lenis
Bison sp.
Mastodon americanus
Archidiskodon columbi

RECENT.

For purpose of comparison, a synoptic list of the recent land mammals of Florida, is here given, compiled chiefly from Elliot's "Synopsis," Miller's "List," and Anthony's "Field Book" of North American mammals. It omits bats and also those species or subspecies which are peculiar to islands or

keys off the coast of Florida, or which may enter northern Florida, but cannot be considered indigenous in the peninsula.

Didelphis virginiana pigra—Opossum.
Scalopus aquaticus parvus—Little Mole.
S. a. australis—Florida Mole.
Cryptotis floridana—Florida short-tailed shrew.
Blarina brevicauda peninsulae—Everglade short-tailed shrew.
Sciurus carolinensis extimus—Everglade Gray squirrel.
S. c. carolinensis—Southern gray squirrel.
Sciurus niger niger—Southern fox squirrel.
S. n. avicennia—Mangrove fox squirrel.
Glaucomys volans querceti—Florida flying squirrel.
Geomys floridanus floridanus—Florida Pocket gopher (salamander).
G. f. austrinus—Southern pocket gopher.
Reithrodontomys humilis humilis—Eastern harvest mouse.
Peromyscus polionotus (Five or six subspecies in Florida)—White-footed mice, beach mice.
P. gossypinus—(Two or three subspecies in Florida)—Cotton mice.
P. nuttali aureolus—Southern golden mouse.
P. floridanus—Florida white-footed mouse.
Oryzomys palustris natator—Central Florida Rice rat.
O. p. coloratus—Everglades rice rat.
Sigmodon hispidus littoralis—Florida cotton rat.
S. h. spadicipygus—Cape Sable cotton rat.
Neotoma floridana floridana—Florida wood rat.
Pitymys parvulus—Florida pine mouse.
Neofiber alleni alleni—Round-tailed muskrat.
N. a. nigrescens—Everglade round-tailed muskrat.
Sylvilagus floridanus floridanus—Florida cottontail.
S. f. mallurus—Eastern cottontail.
S. palustris palustris—Carolina marsh rabbit.
S. p. paludicola—Florida marsh rabbit.
Euarctos floridanus—Florida black bear, Everglade bear.
Procyon lotor lotor—Eastern raccoon.
P. l. elucus—Florida raccoon.
Mustela peninsulae peninsulae—Florida weasel.
M. vison lutensis—Florida mink.
Lutra canadensis vaga—Florida otter.
Spilogale ambarvalis—Florida spotted skunk.
Mephitis elongata—Florida striped skunk.
Urocyon cinereoargenteus floridanus—Florida gray fox.
Canis floridanus—Florida wolf.
Felis coryi—Florida cougar.
Lynx rufus floridanus—Florida bobcat.
Odocoileus osceola—Florida white-tailed deer.

Equus, 238, 244, 248, 253, 264, 268, 270, 271, 272, 273, 274, 275, 276, 277, 278
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